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ABSTRACT

Predictive validities were comparatively evaluated for a direct (SCAAS) and an indirect (ISCS) measure of academic self-confidence. Both instruments significantly predicted a variety of criteria for ninth-grade males (N=55). Predictions for females (N=44) were generally lower than for males, and the indirect measure was ineffective. The two measures were found to share roughly 36% common variance, attenuated to 77% for males and 58% for females. The direct measure generally predicted better than the indirect measure on standardized ability tests. These results reversed those found using college males, but corresponded to results for college females. (Author)

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COMPARATIVE VALIDATION OF A DIRECT AND AN INDIRECT MEASURE OF ACADEMIC SELF-CONFIDENCE

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INTRODUCTION

Attempts to understand and predict academic performance have traditionally relied on ability and motivation constructs. After a half century of intensive test development efforts, ability measures now appear to account for less than fifty percent of the total variance accounted for in academic performance. Despite general recognition of the importance of non-cognitive variables in predicting school achievement, psychometricians have been slow in shifting their research focus to the affective domain.

It has frequently been asserted by theorists that students with positive feelings about themselves may perform better in school than students with low self-regard (Hamacheck, 1971; Perkins, 1964; Lewin, 1951).

While the research evidence tends to substantiate the hypothesized relationship between the learner's self-concept and achievement, no uniform body of evidence has developed. Often the lack of uniform findings in the self-concept literature has been attributed to vague definitions of the term self-concept and to measuring instruments which lack demonstrated validity and reliability (Wylie, 1961). Logical analysis also suggests that the term self-concept encompasses many independent aspects of self-evaluation (Lowe, 1961).

Progress in predicting achievement has recently resulted from the development of scales which attempt to measure a relatively specific aspect of self-concept, the student's concept of his academic ability, which appears to be more appropriate for predicting achievement than global measures of self-concept (Brookover, 1965, 1967; Payne, 1962).

While the recently developed instruments directed at measurement of self-concept of academic ability (SCAA) have improved the prediction of achievement (Brookover, 1965) evaluation of the construct self-concept of academic ability is complicated by at least three factors. First, validation criteria for these direct instruments (e.g., Payne, 1962; Brookover, 1965) have been secondary criteria, such as standardized achievement scores, ability scores, and grade point average. Second, a possible difficulty arises from the fact that measures characteristically contain items which ask the student to directly rate his ability. Since many individuals may be emotionally concerned over their true ability, such self-report measures may be purposely distorted. Recent studies, using self-report questionnaire items have demonstrated very low predictive validity for college students (Williams, Hiller, and Paulus, in press; Bardo and Hiller, in press). Third, the high correlations found between indirect criteria (e.g., grade point average and achievement scores) and answers to questions such as, "How do you rank in school compared with your classmates?" may be inflated by the similarity between the criterion and the predictor measures. The research reported here was designed to provide clarification regarding the three problems enumerated above.

Two instruments designed to measure academic confidence were used in the present study. The direct measure was a slightly modified version of the Brookover Scale of Academic Ability (SCAAS) (Brookover, 1965). The indirect measure of self-confidence was obtained through use of a questionnaire (Intellectual Self-Confidence Scale, ISCS) initially developed and validated with college students (Bardo and Hiller, in press; Williams, et al., in press). Items

for the questionnaire had been constructed to represent three behavioral tendencies which were hypothesized to represent self-confidence in academic ability when found together: 1. Self-reliance in matters requiring judgment; 2. Belief in ability to succeed at intellectual tasks; 3. A liking for intellectual activities.

RELATED RESEARCH

A critical review of research literature involving self-concept concluded that the "...total accumulation of substantive findings is disappointing, especially in proportion to the great amount of effort which has obviously been expended." (Wylie, 1961, p. 211). Wylie, 1961 and Brookover, 1966 attempt to improve the usefulness of the self-concept construct by exploring a more restricted aspect of self-evaluation, a child's evaluation of his ability to do school work. A review of recent studies in which these more restricted constructs have been related to achievement provides support for the argument that these constructs are more useful than global measures in predicting achievement (Feather, 1966; Crandall and McGhee, 1968; Tyler, 1958; Brookover, 1965, 1967; Georgi, 1971; Williams, Hiller, and Paulus, 1972; Hiller, 1971, 1972).

METHOD

The present study provided a directly-related criterion measure of academic self-confidence, students' predicted grade when being paid for accuracy. If the SCAAS and the ISCS designed to measure academic self-confidence are valid then they should be positively correlated with the paid predictions. Also, if academic self-

confidence scores represent more than just the students' knowledge of past ability scores, then the correlations between these confidence measures and the criterion should be higher than the correlations between measures of ability (PMA and DAT scores) and the criterion. Furthermore, if, as research cited above indicates, direct measures of academic confidence are susceptible to faking, then the indirect confidence measure (ICSC) should be more highly correlated with the criterion than is the direct measure (SCAAS).

Subjects

The subjects initially employed in this study were all of the ninth grade students enrolled in a second semester orientation class at an average-sized high school. Twelve subjects were dropped due to incomplete data, leaving 55 male and 44 female subjects.

Materials

I. Self-Concept of Academic Ability Scale (SCAAS)

This scale is a slight adaptation of the scale developed by Brookover and his associates. It is a self-report inventory which consists of eight multiple-choice items asking the student for a direct assessment of his academic capabilities relative to his classmates.

II. Intellectual Self-Confidence Scale (ISCS)

This scale is an adaptation of a thirty-five item questionnaire developed by Hiller (1971) and validated with college students (Hiller, 1972; Williams, et al., in press; Bardo and Hiller, in press).

Items for this questionnaire were constructed to represent three behavioral tendencies:

(1) Self-reliance in matters requiring judgment

(2) Belief in ability to succeed at intellectual tasks

(3) A liking for intellectual activity

The first version of the ISCS, which was scored true/false, produced a KR 20 measure of internal consistency of .61 (182 male and 182 female college students), and a two-week test-retest correlation of .84 (N=72). Sex differences were not significant. The revised ISCS employs a five point scale and yields a Cronbach alpha consistency of .78 (271 female) and .73 (204 male). The Cronbach consistency measures with the present sample of high school freshmen were .62 for males and .74 for females.

III. Teacher Rating Form

This form was used to obtain an estimate from teachers of the subjects' intellectual self-confidence.

IV. Lesson and Test Materials

Lesson: The written lesson (about 1400 words) concerned the Lisbon earthquake of 1775 and was constructed by Kropp and Stoker (1966).

Test: A multiple-choice test over the Lisbon Lesson. The test contained sixty items, thirty of which were constructed to measure factual knowledge of the lesson content, and thirty of which were constructed to measure higher level of understanding. Since initial analysis of the data of this study showed no differences in the relationship between these two types of items and predictor variables, only total scores were used in computing grades (Kropp and Stoker, 1966).

V. Secondary Criteria

In addition to the above materials, the following scores were

available from the school files:

Primary Mental Abilities Test (PMA)
Verbal - (V)
Numerical - (N)
Total - (T)

Differential Aptitude Test (DAT)
Verbal plus Numerical - (V & N)

Eighth-grade Achievement Test scores - SRA
Achievement Test Series (8 gr. Ach.)

Eighth-grade teacher ratings of the student's
attitude toward school (8 gr. T. Rat.)

Procedure

Both the direct confidence measure (SCAAS) and the relatively indirect confidence measure (ISCS) were administered during the second week of the second semester. In order to increase the students' cooperation, they were told that their responses to the questionnaire were being sought in order to help their teachers to know them better. A teacher rating form for each student was given to the orientation class teachers and also to teachers who had had the students in their class for the previous semester.

Prior to distribution of the Lisbon Lesson, students were asked to estimate the grade they would receive on the test over the Lisbon material. It was explained that the purpose of the estimates was to see how accurately students are able to estimate their own performance on an academic task. To motivate students to make accurate predictions, the following system of payment printed on a large poster board was explained:

$2.00 will be paid to all students who correctly predict
that they will earn a grade of "A"

$1.00 will be paid to all students who correctly predict
that they will earn a grade of "B"

$ .50 will be paid to all students who correctly predict
that they will earn a grade of "C"

$ .20 will be paid to all students who correctly predict that they will earn a grade of "D"

$ .10 will be paid to all students who correctly predict that they will earn a grade of "F"

PLEASE NOTE: THE ABOVE AMOUNTS WILL BE PAID ONLY FOR CORRECT PREDICTIONS. IF YOUR PREDICTION IS NOT CORRECT, YOU WILL RECEIVE ONLY ½ THE AMOUNT YOU WOULD HAVE RECEIVED FOR A CORRECT PREDICTION.

The above data were analyzed separately for males and females, since previous research has indicated important sex differences in academic prediction which is based on noncognitive measures (Long, 1964).

RESULTS

The present study was designed to clarify three difficulties in evaluating the Brookover SCAAS. First, past studies have not provided strong evidence for SCAAS validity since the criteria employed are only hypothesized correlates of SCAA such as achievement scores and grade point average. Second, the similarity of some of the SCAAS items and the achievement indices used as criterion measures suggests the possibility that the high positive correlations between the two measures may be due in part to confounding of predictor and criterion. Third, since the validity of the SCAAS depends on honest public self-appraisal, the possibility of purposeful distortion or faking presents a measurement problem.

The first difficulty was approached by providing a criterion measure designed to assess students' confidence in a relatively direct manner. Students were paid to predict their performance on a test over a lesson to be read in class. Inaccurate predictions were penalized by reducing the payoff. The construct validity of the

SCAAS was assessed through correlating students' predictions with scores on the SCAAS. A separate confidence measure, the ISCS, was also evaluated against the student prediction criterion. Additional information regarding the validity of the two scales (SCAAS and ISCS) was provided by examining the correlations between the scales and also between each scale and various secondary criteria.

CORRELATION BETWEEN SCAAS, ISCS, AND THE PRIMARY VALIDATION CRITERION - STUDENTS' PREDICTIONS (see Tables 1 and 2)

The SCAAS correlated significantly with students' predictions for both males ($r=.68$, $p<.01$) and females ($r=.67$, $p<.01$).

The ISCS correlated significantly for males ($r=.48$, $p<.01$) but not for females ($r=.14$, ns).

CORRELATION BETWEEN SCAAS AND ISCS (see Tables 1 and 2)

The two measures were found to be significantly correlated both for males ($r=.66$, $p<.01$) and for females ($r=.50$, $p<.01$).

The above results show that both the SCAAS and the ISCS are valid measures of confidence for males, as indicated by their relationship with the criterion of students' predictions. While the SCAAS appeared equally valid with males and females, the ISCS was not significantly related to female predicted grades. While the ISCS was significantly related to the SCAAS for females, the two measures shared only twenty-five percent common variance, as compared with forty-four percent common variance for males.

CORRELATIONS OF ABILITY MEASURES AND SCAAS WITH PRIMARY CRITERION OF STUDENT'S PREDICTION (see Tables 1 and 2)

The question of the extent to which the relatively direct SCAAS measures knowledge of past achievement scores as opposed to true confidence was raised. If actual confidence were being measured in addition to mere description of past performance, then SCAAS ought to correlate more highly with the primary criterion of this study than any of the measures of past performance such as the eighth grade achievement scores or the standardized ability scores.

	Males (see Table 1)	Females (see Table 2)
SCAAS	.68	.67
PMA-V	.57	.57
DAT	.58	.55
8 gr. Ach.	.76	.69

The results show that the eighth grade achievement score is more highly correlated with the student's prediction criterion than is the SCAAS, although the SCAAS is more highly correlated with the criterion than are PMA-Verbal Ability scores or DAT-Verbal plus Numerical Reasoning scores.

CORRELATIONS BETWEEN SCAAS AND STUDENTS' PREDICTIONS WITH ABILITY AND ACHIEVEMENT SCORES PARTIALED OUT
(see Tables 1 and 2)

Additional information concerning possible confounding of SCAAS and performance measures was provided by the partial correlations of SCAAS with the criterion where ability (PMA-V) or eighth grade achievement have been partialed out.

The correlation between SCAAS and the criterion with PMA-V partialed out was .52 ($p<.01$), and with eighth grade achievement partialed out was .48 ($p<.01$).

The results show that the correlations between SCAAS and students' predictions remain significant when the variance accounted for by PMA-Verbal or by eighth grade achievement scores is partialed out of these correlations.

MULTIPLE CORRELATIONS OF SCAAS COMBINED WITH PMA-VERBAL SCORES PREDICTING THE PRIMARY CRITERION - STUDENTS' PREDICTIONS (see Tables 1 and 2)

Since the SCAAS was shown to provide prediction of the criterion which is unique from performance measures, multiple correlations were computed to determine whether SCAAS and performance measures combined would provide a better prediction of the criterion - students' confidence - than would either measure alone.

	Predictors	R^2	Predictor removed	F-ratio	p
Males	PMA-Verbal	.53	SCAAS	21.8	.00002
	SCAAS	.53	PMA-Verbal	5.23	.026
Females	PMA-Verbal	.55	SCAAS	20.7	.00004
	SCAAS	.55	PMA-Verbal	9.5	.003

Results of multiple correlational procedures show that combining SCAAS and PMA-Verbal ability scores increased the prediction of the primary criterion. Removing either SCAAS or PMA-Verbal scores resulted in a significant loss of variance accounted for.

CORRELATIONS OF SCAAS AND ISCS WITH GRADES ON THE LISBON TEST (see Tables 1 and 2)

The SCAAS was significantly related to Lisbon grades for both males ($r=.60$, $p<.01$) and females ($r=.40$, $p<.01$).

The ISCS was significantly related for males ($r=.45$, $p<.01$) but not for females ($r=.15$, ns).

CORRELATIONS OF SCAAS AND ISCS WITH
EIGHTH GRADE ACHIEVEMENT SCORES
(see Tables 1 and 2)

The SCAAS correlated significantly with eighth grade achievement for males ($r=.69$, $p<.01$), but not for females ($r=.31$, p ns).

The ISCS correlated significantly for males ($r=.53$, $p<.01$) but not for females ($r=.11$, p ns).

CORRELATIONS OF SCAAS AND ISCS WITH EIGHTH GRADE TEACHER
RATINGS OF STUDENTS' ATTITUDE TOWARD LEARNING
(see Tables 1 and 2)

The SCAAS correlated significantly with eighth grade teacher ratings of students' attitude for both males ($r=.50$, $p<.01$) and females ($r=.48$, $p<.05$).

The ISCS correlated significantly for males ($r=.57$, $p<.01$) but not for females ($r=.29$, ns).

TABLE 1

MALE INTERCORRELATIONS+

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	N
1.	SCAAS																		54
2.	ISCS	66*																	54
3.	PMA-V	58*	44*																54
4.	PMA-N	78*	56*	71*															54
5.	PMA-T	68*	49*	85*	83*														54
6.	DAT V & N	70*	59*	75*	78*	81*													54
7.	9 gr. Ach.	69*	53*	72*	71*	69*	66*												32
8.	Grade	60*	45*	58*	50*	55*	49*	63*											54
9.	Conf. P. T.	45@	46@	17	29	18	30		27										26
10.	Conf. N. T.	47@	46@	34	37	39	67*		31	44@									26
11.	Lrn. Att. P.T.	42@	48@	-17	02	-17	12		10	63*	27								26
12.	Lrn. Att. N.T.	56*	33	31	45@	44@	63*		33	45@	79*	32							26
13.	8 gr. T. Rat.	50*	57*	45*	40@	47*	41@	60*	56*										32
14.	H. R.	10	27	-19	-16	-16	04		08	50@	20	74*	34						26
15.	Opin. Vol.	00	09	-43@	-28	-38	-14		-04	63*	24	64*	07		61*				26
16.	Contr. Opin.	-14	-12	-10	-16	-08	01		06	27	29	08	07		31	59*			26
17.	Pred. gr.	68*	48*	57*	58*	54*	58*	76*	62*	42@	30	36	41@	58*	15	-14	-11		54

+ Where there is a difference in the size of N when reading a column and reading a row, the smaller N is correct

@ p .05
* p .01

Cronbach Alpha Reliabilities SCAAS .86 ISCS .62

TABLE 2

FEMALE INTERCORRELATIONS+

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	N
1.	SCAAS																		44
2.	ISCS	50*																	44
3.	PMA-V	42*	08																44
4.	PMA-N	47*	31@	62*															44
5.	PMA-T	50*	24	87*	77*														44
6.	DAT V & N	44*	22	76*	74*	84*													44
7.	8 gr. Ach.	31	11	77*	83*	85*	88*												25
8.	Grade	40*	15	65*	51*	66*	63*	52*											44
9.	Conf. P. T.	50*	26	52*	48*	52*	45*		55*										33
10.	Conf. N. T.	49*	10	47*	27	50*	39@		39@	44@									33
11.	Lrn. Att. P.T.	39@	36@	47*	50*	57*	45*		42@	69*	44@								33
12.	Lrn. Att. N.T.	40@	20	55*	36@	48*	33@		36@	60*	67*	46*							33
13.	8 gr. T. Rat.	48@	29	71*	62*	70*	64*	66*	52*										25
14.	H. R.	40@	10	50*	54*	54*	51*		58*	83*	45*	75*	52*						33
15.	Opin. Vol.	46*	10	50*	50*	48*	42@		51*	82*	42@	71*	47*		89*				33
16.	Contr. Opin.	37@	03	49*	46*	50*	41@		35@	77*	45*	59*	43*		87*	89*			33
17.	Pred. gr.	67*	14	57*	50*	59*	55*	69*	58*	51*	54*	47*	44@	73*	59*	48*	43@		44

+ Where there is a difference in the size of N when reading a column and reading a row, the smaller N is correct

@ p .05
* p .01

Cronbach Alpha Reliabilities SCAAS .82 ISCS .74

TABLE 3

MALES - N=54
MULTIPLE CORRELATIONS

Predictors	Criterion	R^2	Predictor Removed	F-ratio	p
PMA-V ISCS	predicted grade	.40	ISCS	5.5	.02
PMA-V SCAA	predicted grade	.53	SCAA	21.8	.0002
PMA-V ISCS	grade	.38	ISCS	3.9	.05
PMA-V SCAA	grade	.44	SCAA	9.8	.002
PMA-T ISCS	8th gr. achievement	.54	ISCS	4.1	.05
PMA-T SCAA	8th gr. achievement	.58	SCAA	7.6	.0009
PMA-T ISCS	8th gr. teacher rating	.38	ISCS	8.03	.008
PMA-T SCAA	8th gr. teacher rating	.29	SCAA	3.06	.09

TABLE 4

FEMALES - N=44
MULTIPLE CORRELATIONS

Predictors	Criterion	R^2	Predictor Removed	F-ratio	p
PMA-V ISCS	predicted grade	.33	ISCS	.57	.45
PMA-V SCAA	predicted grade	.55	SCAA	20.8	.0004
PMA-V ISCS	grade	.43	ISCS	.76	.39
PMA-V SCAA	grade	.44	SCAA	1.46	.23
PMA-T ISCS	8th gr. achievement	.74	ISCS	.68	.42
PMA-T SCAA	8th gr. achievement	.73	SCAA	.24	.62
PMA-T ISCS	8th gr. tchr. rating	.51	ISCS	.89	.35
PMA-T SCAA	8th gr. tchr. rating	.53	SCAA	2.04	.16

DISCUSSION

The present study provided a criterion measure of academic confidence which appears more directly related to the construct of academic confidence than are the previous criteria of grade point average and standardized performance measures. Students were paid to predict the grade they thought they would earn on a test over a conventional lesson read in class. A system of payment wherein accurate predictions resulted in maximum pay was explained to them before they made their predictions. Inaccurate predictions were penalized by a reduced payoff.

The results presented in Tables 1 and 2 show the SCAAS to be positively and significantly related to the criterion-students' predictions for both males ($r=.68$ $p<.01$) and for females ($r=.67$ $p<.01$). Additional support for the validity of the SCAAS comes from the correlations between SCAAS and teacher ratings.

TEACHER RATINGS OF THEIR STUDENT'S ACADEMIC CONFIDENCE COMPARED WITH SCAAS SCORES

Teacher ratings of students' academic confidence and attitude toward learning were correlated with the students' own assessment of their academic ability as measured by the SCAAS. The results show the SCAAS to be significantly related to these ratings. In addition, ratings (obtained from the school files) of student motivation and attitude toward learning made by eighth grade teachers were found to be significantly correlated with SCAAS scores.

THE RELATIONSHIP BETWEEN SCAAS AND ACADEMIC PERFORMANCE MEASURES

The SCAAS was found to be highly related to student's grades on the Lisbon test, eighth grade achievement, and two standardized academic ability measures (the PMA and the DAT). These correlations (see Tables 1 and 2) are similar to those found in earlier validation studies with the SCAAS (Brookover, 1965; Patterson, 1967).

EVIDENCE REGARDING POSSIBLE CONFOUNDING OF SCAAS WITH PAST VALIDATION CRITERIA

Earlier studies have concluded that construct validity of the SCAAS is demonstrated by the high correlation between SCAAS and achievement indices such as grade point average and standardized performance measures. Examination of SCAAS items suggests that this correlation may be inflated by the similarity of criterion and predictor. While a student may be indicating confidence by his response to items such as, "How do you rate yourself in school ability compared with those in your class in school?", he may instead simply be reporting knowledge of his past performance on school ability tests. The criterion of the present study provides a means of assessing the extent to which knowledge of performance inflates the correlations of the SCAAS with achievement criteria. Specifically, if SCAAS is not measuring confidence beyond that which may be attributed to past performance, then the correlation between SCAAS and students' predictions should no longer be significant when achievement or ability is partialed out of the SCAAS-Criterion correlation. The results show that correlations between SCAAS and the criterion remain highly significant even when PMA verbal ability or eighth grade achievement is partialed out of the correlation. Also results of multiple regression analysis (Tables 3 and 4) show an increase in variance accounted for when SCAAS scores are combined with PMA-verbal

and with eighth grade achievement scores in predicting the criterion. The finding that the SCAAS is significantly correlated with the primary and secondary criteria of this study, and that correlations between SCAAS and the primary criterion remain significant when achievement or ability are partialed out provides strong support for the construct validity of this instrument.

POSSIBLE FAKING ON THE SCAAS

The validity of the SCAAS depends upon students being mature enough to understand the questions concerning their academic ability yet sufficiently cooperative to answer them honestly. If students purposely misrepresent their confidence estimates when asked to rate themselves in a direct manner, the Intellectual Self-Confidence Scale (ISCS) was included to investigate the possibility that a relatively indirect instrument may be more valid. The results show that the SCAAS provides a better predictor of the major criteria of the study. For males the ISCS was found to be significantly related to all major criteria; however, for females the ISCS was not predictive.

Evidence was cited showing the Brookover SCAAS to be a potentially useful instrument for measuring academic confidence. The results of this research are in agreement with earlier studies showing the SCAAS highly related to achievement variables. Most importantly, information has been presented which clarifies questions regarding the construct validity of the SCAAS by showing its relationship to a criterion measure designed to be directly related to confidence.

LIMITATIONS OF THE PRESENT STUDY

While the primary criterion of this study appears to provide an

improvement over criteria used in other construct validation studies involving academic confidence, there are possible limitations of this criterion as it was used in this study. For example, the absolute difference in money for incorrect or correct predictions may have been too small to encourage accurate predictions at the lower level. Since raising the payoff for the lower grades would reduce the incentive for predicting at the higher grade levels, it appears that raising all payoff amounts would be necessary.

THE RELATIONSHIP BETWEEN ACADEMIC CONFIDENCE AND SCHOOL PERFORMANCE

The results of the present research based on correlational evidence do not allow conclusions regarding the question of which causes which. There appears to be general agreement among those who have written on the subject that the relationship is a reciprocal one (Hamacheck, 1961, p. 187; Brookover, 1967, p. 12).

IMPLICATIONS FOR FUTURE RESEARCH

A promising approach would be to direct research toward developing measures of confidence for use with younger children. If academic confidence can be reliably and validly measured in the early grades, it would then be possible to investigate the factors which contribute to such confidence and explore ways of facilitating its development.

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